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AF/2700

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re:	US Patent Application	09/934,817
	Filed	August 21, 2001
	Title	Optical Arrangement and Projection Illumination Equipment for Microlithography with Passive Thermal Compensation
	Applicant	Wagner
	Art Unit	2171
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Mail Stop Appeal Brief
Technology Center 2171
Commissioner for Patents
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Appeal Brief Filed Under 37 CFR 1.192 and MPEP 1206

REAL PARTY IN INTEREST

The real party in interest is Carl Zeiss Stiftung, Trading as Carl Zeiss.

RELATED APPEALS AND INTERFERENCES

None.

STATUS OF CLAIMS

Claims 1-37 and 39-41 are in the case. These claims were subject to final rejection.

Claims 38 and 42-44 are cancelled.

STATUS OF AMENDMENTS

An Amendment After Final Rejection was filed December 15, 2003.

SUMMARY OF THE INVENTION

Claim 1 and the claims dependent on claim 1 (claims 5, 6, 11, 13, 17, 21, 28, 26, 35 and 39) cover an optical arrangement comprising a light source that emits radiation and a connecting structure between an optical element fastened to a mount having a symmetry characteristic that

substantially does not correspond to the shape of the optical element. This is shown in Figures 1 and 2 and described in the specification.

Claim 2 and claims dependent on claim 2 (claims 7, 8, 14, 18, 22 , 27 and 28) cover the optical arrangement similar to claim 1 with the addition of a single or multi-part thermally conducting element having a form of a heat transport that effects an at least partial compensation of the asymmetry of temperature distribution in the optical element. This arrangement also is shown in Figures 1 and 2 and the description in the specification covering these Figures.

Claim 3 and claims dependent on claim 3 (claims 9, 10, 15, 19, 29, 30, 31 and 41) cover a projection exposure system including an optical element that is heated by radiation in a manner that lacks rotation symmetry and a cooling system for the optical element that lacks rotation symmetry. The cooling system includes passive thermally conducting elements that affect cooling in which the thermally conducting elements comprise adjustable portions. This is shown in Figure 4 and the description of Figure 4 in the specification.

Claim 4 and claims dependent on claim 4 (claims 11, 12, 16, 20, 24, 32, 33, and 34) are similar to claim 3 and further specify that at least one passive thermally conducting part of the thermal conductor comprises a plurality of different materials in which at least one passive thermally conducting part is at least partially adjustable. This covers the embodiment of Figure 4.

GROUPING OF CLAIMS

The claims covered by Groups 1-4 do not stand or fall together.

ISSUES AND ARGUMENT

Claims 1, 3 and 4 were rejected as anticipated under 35 USC 102(b) by the Patent to Hyatt. This rejection was treated in the Amendment submitted June 13, 2003. Valid Rejection

under 35 USC 102(b) requires that each feature of a rejected claim be disclosed in a single reference either explicitly or impliedly. Hyatt does not disclose or suggest each feature of the rejected claims. Hyatt neither shows nor describes the claimed feature of a "connecting structure between the optical element and the mount having asymmetry characteristic that does not correspond to the shape of the optical element" but just the opposite.

Claims 1-12, 17-35, 43 and 44 are rejected under 35 USC 103 as being unpatentable over Unno in view of Nishi. The arguments against this rejection are set forth in the Amendment of June 13, 2003. Nishi in no way addresses cooling of lenses. And Unno is diametrical to the idea of passive thermal compensation and hence gives no suggestion at all for a combination with Nishi.

In In Re Sang-Su Lee (00-1158) the Court of Appeals for the Federal Circuit rendered a decision confirming the above principles. The court analyzed 35 USC 103 requirements starting from the Administrative Procedure Act and held (citations omitted):

> "Tribunals of the PTO are governed by the Administrative Procedure Act, and their rulings receive the same judicial deference as do tribunals of other administrative agencies.
>
> "The Administrative Procedure Act, which governs the proceedings of administrative agencies and related judicial review, establishes a scheme of "reasoned decision making." Not only must an agency's decreed result be within the scope of its lawful authority, but the process by which it reaches that result must be logical and rational.
>
> "As applied to the determination of patentability vel non when the issue is obviousness, it is fundamental that rejections under 35 USC §103 must be based on evidence comprehended by the language of that section. (Emphasis added). When patentability turns on the question of

obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. (Emphasis added)

"The factual inquiry whether to combine references must be thorough and searching. It must be based on objective evidence of record. This precedent has been reinforced in myriad decisions, and cannot be dispensed with. Our case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation to combine prior art references. There must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the Applicant. Teachings of references can be combined only if there is some suggestion or incentive to do so."

MPEP 2142 draws from this judicial analysis to set further and confirm "The Legal Concept of Prime Facie Obviousness"

Unno and Nishi do not motivate or suggest to a person skilled in the art to combine these references to duplicate the claims of the present invention.

In Figure 2 of Nishi, reference numerals G1, G2, are described at column 11, line 22 to column 12, line 22. G1, G2 are identified as "lens frames" and nothing is described about their geometry.

Only column 11, line 39, provides information concerning their geometry: "a gas chamber enclosed by the lens elements 33, 34 and the lens frame G1 is sealed, ...".

Lenses are rotationally symmetrical, so generally are the lens barrels 4. The frames G1, G2 in order to seal chambers then must be annular parts. This is a widespread basic form of lens moments. The existence of small bores/tubes through the frames G1, G2 does not change this

except theoretically. Deviation from rotational symmetry is too small for all mechanical and thermal effects. The word "corresponding" in claim 1 is understood to incorporate such mirror deviations from the exact matching c.f. discussion of Figures 5a/5b in [0039] f.f.

Nishi in no way addresses cooling of lenses, and any deviations from a rotational symmetric shape of lens frames G1, G2 is only motivated by the demand for gas supply holes. It is not evident that G2 has such bores in the mountings shown as hatched cross sections. Simple holes in lens tube 4 look the same in the cross section and are identical in effect with G2 combined of 4 separate annular mountings.

The referenced patent to Unno is the US counterpart of EP-A 0 678 768, originally cited in the specification of the present application, paragraph [0004]. Paragraph [0004] is replaced by new paragraph [0004] to clarify that the cited European patent to Unno originally cited in the specification corresponds to the US Patent to Unno.

On page 4 of the Office Action the Examiner notes that Unno does not disclose a "mount having a symmetry characteristic that does not correspond to the shape of the optical element."

Unno is diametrical to the idea of passive thermal compensation and hence gives no suggestion at all for a combination of Unno and Nishi as suggested in the Office Action.

None of the cited references addresses passive cooling of optical elements adapted to the geometry of their exposure, and hence all the claims currently on file remain novel and non non-obvious.

APPENDIX

An Appendix containing a copy of the claims involved in this Appeal is submitted herewith.

This Appeal Brief is filed within two months following the two-month period of the Notice of Appeal. An additional two months is petitioned and paid for under 37 CFR 1.136(a). Credit Card Payment Form PTO-2038 is enclosed to cover the prescribed Appeal Brief fee of $330 and Large Entity two-month extension fee of $420 for a total of $750. Please charge any additional fees or credit any overpayments to Deposit Account 11-0665. A duplicate of this page is enclosed for this purpose.

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I hereby certify this correspondence is being deposited with the US Postal Service in an envelope with sufficient postage to PO Box 1450, Commissioner for Patents, Alexandria, VA 22313-1450 by Express Mail on March 31, 2004. Express Mail Number ER 744773317 US.

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APPENDIX

In the Claims:

1 (Currently Amended). An optical arrangement, comprising:

a light source that emits radiation,

a mount,

an optical element fastened in said mount,

wherein said optical element is acted on by said radiation such that a heat supply results from said radiation that lacks symmetry corresponding to the shape of said optical element, and

a connecting structure between said mount and said optical element ~~and said mount~~, having a symmetry characteristic that substantially does not correspond to the shape of the optical element.

2 (Previously Presented). An optical arrangement, comprising:

a light source that emits radiation,

a mount,

an optical element fastened in said mount,

wherein said optical element is acted on by said radiation such that heat that results from said radiation lacks symmetry corresponding to the shape of said optical element, and

a single- or multi-part thermally conducting element arranged in operative connection with said optical element and said mount and having a form of heat transport that effects an at least partial compensation of the asymmetry of temperature distribution in said optical element.

3.(Previously Amended) A projection exposure system for microlithography, comprising:

an optical element that is heated by radiation in a manner that lacks rotational symmetry, and

a cooling system for said optical element that lacks rotational symmetry, said cooling system including passive thermally conducting elements that effect cooling, in which said thermally conducting elements comprise adjustable portions.

4.(Previously Amended) A projection exposure system for microlithography, comprising

an optical element that is heated by radiation in a manner that lacks rotational symmetry, and

at least one passive~~ly~~ thermally conducting part arranged in thermal contact with said optical element, which part covers a portion of the cross section of said optical element which is not exposed to said radiation, and which part reduces temperature gradients in said optical element, in which said at least one passive thermally conducting part of a thermal conductor in thermal contact with said optical element comprises a plurality of different materials and in which said at least one passive thermally conducting part of a thermal conductor in thermal contact with said optical element is at least partially adjustable.

5 (Previously Presented). The optical arrangement according to claim 1, in which said optical element comprises a transmitting element.

6 (Previously Presented). The optical arrangement according to claim 5, in which

said transmitting element comprises a lens.

7 (Previously Presented). The optical arrangement according to claim 2, in which said optical element comprises a transmitting element.

8 (Previously Presented). The optical arrangement according to claim 7, in which said transmitting element comprises a lens.

9 (Previously Presented). The projection exposure system according to claim 3, in which said optical element comprises a transmitting element.

10 (Previously Presented). The projection exposure system according to claim 9, in which said transmitting element comprises a lens.

11 (Previously Presented). The projection exposure system according to claim 4, in which said optical element comprises a transmitting element.

12 (Previously Presented). The projection exposure system according to claim 11, in which said transmitting element comprises a lens.

13 (Previously Presented). The optical arrangement according to claim 1, in which said optical element comprises a mirror.

14 (Previously Presented). The optical arrangement according to claim 2, in which said optical element comprises a mirror.

15 (Previously Presented). The projection exposure system according to claim 3, in which said optical element comprises a mirror.

16 (Previously Presented). The projection exposure system according to claim 4, in which said optical element comprises a mirror.

17 (Previously Presented). The optical arrangement according to claim 1, having a slit-shaped image field.

18 (Previously Presented). The optical arrangement according to claim 2, having a slit-shaped image field.

19 (Previously Presented). The projection exposure system according to claim 3, having a slit-shaped image field.

20 (Previously Presented). The projection exposure system according to claim 4, having a slit-shaped image field.

21 (Previously Presented). The optical arrangement according to claim 5, in which said optical element is arranged near a field plane.

22 (Previously Presented). The optical arrangement according to claim 7, in which said optical element is arranged near a field plane.

23 (Previously Presented). The projection exposure system according to claim 9, in which said optical element is arranged near a field plane.

24 (Previously Presented). The projection exposure system according to claim 11, in which said optical element is arranged near a field plane.

25 (Previously Presented). The optical arrangement according to claim 1, further comprising a reticle, the illumination of which lacks rotational symmetry.

26 (Previously Presented). The optical arrangement according to claim 25, in which said reticle illumination consists of off-axis, dipole or quadrupole illumination.

27 (Previously Presented). The optical arrangement according to claim 2, further comprising a reticle, the illumination of which lacks rotational symmetry.

28 (Previously Presented). The optical arrangement according to claim 27, in which said reticle illumination consists of off-axis, dipole or quadrupole illumination type.

29 (Previously Presented). The projection exposure system according claim 3, further comprising a reticle, the illumination of which lacks rotational symmetry.

30 (Previously Presented). The projection exposure system according to claim 29, in which said reticle illumination consists of off-axis, dipole or quadrupole illumination type.

31 (Previously Presented). The projection exposure system according to claim 29, in which said optical element is arranged near a pupil plane.

32 (Previously Presented). The projection exposure system according to claim 4, further comprising a reticle, the illumination of which lacks rotational symmetry.

33 (Previously Presented). The projection exposure system according to claim 32, in which said reticle illumination consists of off-axis, dipole or quadrupole illumination type.

34 (Previously Presented). The projection exposure system according to claim 32, in which said optical element is arranged near a pupil plane.

35 (Previously Presented). The optical arrangement according to claim 1, in which said connecting structure comprises portions of different materials.

36 (Previously Presented). An optical arrangement comprising:

a light source that emits radiation,

a mount,

an optical element fastened to said mount,

wherein said optical element is acted on by said radiation such that heat that results from said radiation lacks symmetry corresponding to the shape of said optical element, and

a single- or multi-part passive thermally conducting element arranged in operative connection with said optical element and said mount and having a form of heat transport that effects an at least partial compensation of the asymmetry of temperature distribution in said optical element,

wherein said passive thermally conducting element comprises an assembly of portions of different material.

37 (Cancelled)

38.(Cancelled)

39 (Previously Presented). The optical arrangement according to claim 1, in which said connecting structure comprises adjustable portions.

40 (Previously Presented). The optical arrangement according to claim 2, in which said thermally conducting element is adjustable.

41 (Previously Presented). The projection exposure system according to claim 3, in which said thermally conducting elements comprise adjustable portions.

42.(Cancelled)

43.(Cancelled)

44.(Cancelled)

45. (New) A system comprising:

an optical element that is heated by radiation in a manner that lacks rotational symmetry, and

a cooling system for said optical element that lacks rotational symmetry, said cooling system including passive thermally conducting devices that effect cooling,

wherein said passive thermally conducting devices comprise portions of different material.